CLAIMS

1. A method of food product testing, such method including the steps of preparing a food sample and,

simultaneously detecting genomic material from a plurality of species with an array of probes to form an output distribution of the species in the food sample.

2. The method of claim 1, wherein the step of preparing includes the step of culturing the food sample to increase populations of a plurality of target organisms prior to testing with the array of probes.

3. The method of claim 2, wherein the step of preparing includes the steps of extracting nucleic acid from target organisms, and

labeling and amplification of gene regions prior to detection with the probe array.

4. The method of claim 3, wherein the step of labeling is performed after the step of amplification.

5. The method of claim 3, wherein the step of amplification is performed by automated fluidics and incubation to produce output material for detection by said array.

6. The method of claim 1, carried out by an automated sample preparation and array testing system.

7. The method of claim 6, further wherein a computer operates upon an output of an array reader to output said distribution, including a data mining program effective to correlate a detected distribution with database information.

8. The method of claim 1, comprising the steps of recovering plural different microorganisms from the food sample, extracting DNA from the plural different microorganisms, and simultaneously amplifying plural target sequences present in the recovered DNA.

9. The method of claim 1, further comprising the step of correlating the output distribution with a database including at least one of other output distributions, food parameters and process history parameters.

10. A probe array comprising a plurality of probes for binding to labeled sequences of multiple species to develop detectable indications of the presence of said sequences in a sample, wherein said plurality of probes are located at respective predetermined positions of the array, and are directed to multiple different target species of organisms and to multiple characterizing sequences for each species, such that when exposed to a prepared sample, the array reads out a distribution of the target species which are present in the sample.

11. The probe array of claim 10, wherein the species are food product species.

12. The probe array of claim 10, wherein the species are clinical species.

13. The probe array of claim 10, wherein the species are workplace or environmental species.

14. A testing method comprising the steps of

preparing an array having plurality of probes directed to target sequences of a defined plurality of target species

preparing a sample, wherein the step of preparing a sample includes extracting DNA from the sample, including sequences of the defined species present in the sample,

treating the extracted DNA with a PCR protocol effective to preferentially and simultaneously increase the level of target DNA sequences of the defined species, and

hybridizing the amplified DNA to the probes on the array to thereby determine an output distribution of the target species present in the sample.

15. The testing method of claim 14, further comprising the steps of storing the output distribution in a database.

16. The testing method of claim 15, further comprising the step of mining the database to determine a correlation of species with an extrinsic parameter.

17. The testing method of claim 14, wherein the species are foodborne species affecting food safety or quality.

18. The testing method of claim 14, wherein the target sequences include species sequences coding for pathogenicity or virulence.

19. The testing method of claim 14, wherein the target sequences are species sequences selected for efficient PCR amplification as a group.

20. The testing method of claim 14, wherein the array tests for a pallette of species selected from among product colonizing species, environment colonizing species, and mammalian colonizing species.

21. The testing method of claim 16, further comprising the step of displaying the distribution with a note indicating required action.

22. A food testing system, comprising

a first apparatus including a sample receiving chamber and a fluidics system connected to the chamber

a substrate in the chamber effective to immobilize DNA, and the fluidics system operating under automated control to control supplies of multiple primers and probes in coordination with a heater so as to simultaneously amplify, by polymerase chain reaction (PCR), a plurality of gene sequences characteristic of a target group of species, and

an array reader configured to read a probe array fabricated with probes for said gene sequences and to output a distribution indicating which species of the target group of species are present in a sample placed in the sample receiving chamber.

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